Presenter’s Name

Presenter’s Command

Local Contact Information

For additional information, you may contact your local Preventive Medicine Department at (502) 624-0502/0507

Introduction

Prevention of Cold Injuries is a Command and Individual Responsibility

ALL COLD WEATHER INJURIES ARE PREVENTABLE!!!

Outline

- Susceptibility Factors
- Cold Weather Injuries
  - description
  - treatment
  - Prevention
- Cold Casualty Risk Management
- Conclusion

Susceptibility Factors

- Previous cold weather injury
- Inadequate nutrition
- Alcohol, nicotine use
- Dehydration
- Overactivity (sweating)
- Underactivity
- Long exposure to the cold
- Sick or injured
- Acclimatization
- Ethnic/geographic origin
- Wind, cold, rain
- Age
- Discipline and morale
- Physical stamina
- Inadequate training
- Poor clothing and equip

Typical Victim of a Cold Weather Injury

- Male
- E-4 or below
- Approximately 20 years old
- From a warm climate
- Less than 18 months time in service
- Uses tobacco, alcohol or medications
- Neglects proper foot care

Types of Cold Injuries

- Hypothermia
- Frostbite
- Chilblains
- Immersion/Trench Foot
- Dehydration
- Carbon Monoxide Poisoning
- Snow Blindness
- Sunburn

Hypothermia

- MEDICAL EMERGENCY; life threatening condition
- Severe body heat loss-body temp falls below 95◦F
- Occurs when:
  - conditions are windy, clothing is wet, and/or the individual is inactive
  - extended water exposure or immersion
    - 1 hour or less when water temp is below 45◦F
    - prolonged exposure in slightly cool water (e.g. 60◦F)
    - thunderstorms, hail, rain and accompanying winds

Hypothermia

The “umbles”-stumbles, mumbles, fumbles, and grumbles

- Initial Symptoms
  - shivering
  - dizzy, drowsy
  - withdrawn behavior
  - irritability
  - confusion
  - slowed, slurred speech
  - altered vision
  - stumbling
- Severe Stages
  - stops shivering
  - desire to lie down and sleep
  - heartbeat and breathing is faint or undetectable
  - unconsciousness followed by DEATH

Hypothermia

- Treatment
  - prevent further cold exposure
  - evacuate immediately if severe hypothermia
  - remove wet clothing
  - rewarm in a warmed sleeping bag
  - warm, sweet liquids if conscious
  - minimize handling of the unconscious victim so as to not induce a heart attack.

Hypothermia

- Prevention
  - eat properly and often
  - warm liquids and water
  - wear uniform properly (layers worn loosely)
  - keep active
  - stay dry
  - warming tents
  - get plenty of rest
  - buddy watch/observation/NCO checks

Signs and Symptoms of decreased body temperatures (Hypothermia)

BODY TEMP	SYMPTOMS	OBSERVABLE IN OTHERS	FELT BY YOURSELF
(Early Stage) 98.6 ⇒ 95.0	Intense and uncontrollable shivering; ability to perform complex tasks impaired	Slowing of pace. Intense shivering. Poor coordination.	Fatigue. Uncontrollable fits of shivering. Immobile, fumbling hands.
(Moderate Stage) 95.0 ⇒ 91.4	Violent shivering persists, difficulty in speaking, sluggish thinking, amnesia begins to appear.	Stumbling, lunching gait. Thickness of speech. Poor judgment.	Stumbling. Poor articulation. Feeling of deep cold or numbness.
(Severe Stages) 91.4 ⇒ 87.8	Shivering decreases; replaced by muscular rigidity and erratic, jerky movements; thinking not clear but maintains posture.	Irrationality, incoherence. Memory lapses, amnesia. Hallucinations. Loss of contact with environment.	Disorientation. Decrease in shivering. Stiffening of muscles. Exhaustion, inability to get up after a rest.
87.8 ⇒ 85.2	Victim becomes irrational, loses contact with environment, drifts into stupor; muscular rigidity continues; pulse and respiration slowed.	Blueness of skin. Decreased heart and respiratory rate. Dilation of pupils. Weak or irregular pulse. Stupor.	Blueness of skin. Slow, irregular, or weak pulse. Drowsiness.
85.2 ⇒ 78.8	Unconsciousness; does not respond to spoken work; most reflexes cease to function; heartbeat becomes erratic.	Unconsciousness.	
78.8 ⇓	Failure of cardiac and respiratory control centers in brain; cardiac fibrillation; probable edema and hemorrhage in lungs; apparent death.		

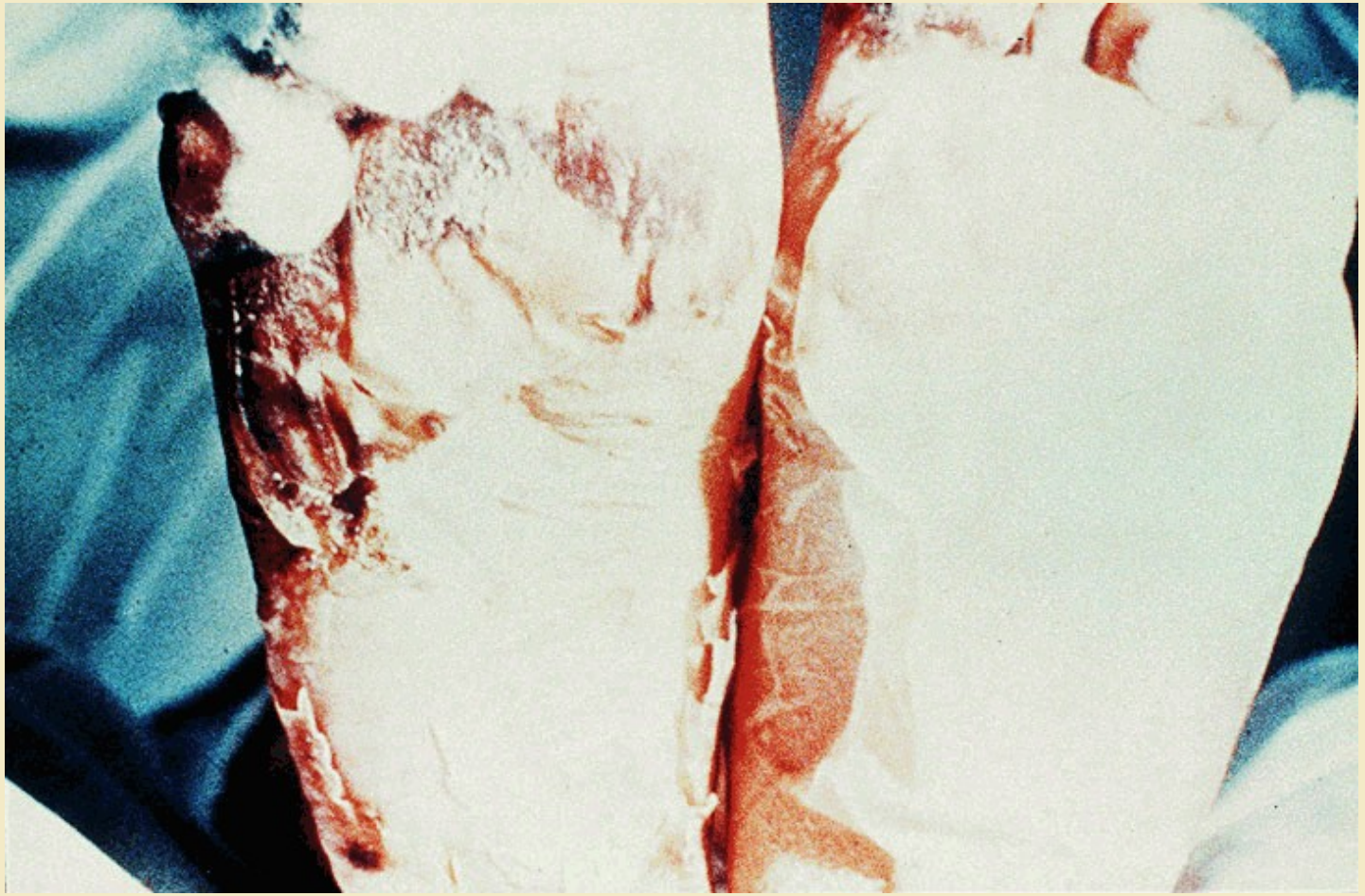
Frostbite

- Air temps below 32°F
  - skin freezes at 28°F
- Superficial frostbite (mild)
  - freezing of skin surface
- Deep frostbite (severe)
  - freezing of skin and flesh, may include bone
- Hands, fingers, feet, toes, ears, chin, nose, groin area

Frostbite

- Symptoms
  - initially redness in light skin or grayish in dark skin
  - tingling, stinging sensation
  - turns numb, yellowish, waxy or gray color
  - feels cold, stiff, woody
  - blisters may develop

Deep Frostbite



Frostbite

- Treatment
  - remove from cold and prevent further heat loss
  - remove constricting clothing and jewelry
  - rewarm affected area evenly with body heat until pain returns
    - when skin thaws it hurts!!
    - do not rewarm a frostbite injury if it could refreeze during evacuation or if victim must walk for medical treatment
  - do not massage affected parts or rub with snow
  - evacuate for medical treatment

Frostbite

- Prevention
  - wear uniform properly (layers and loosely)
  - keep socks and clothing dry (use poly pro/thermax liner socks and foot powder/ change insoles also)
  - protect yourself from wind
  - keep face and ears covered and dry
  - drink hot fluids and eat often
  - keep active
  - insulate yourself from the ground (sleeping pad/tree branches etc…)
  - “Buddy System”
  - caution skin contact with super-cooled metals or fuel
  - Use approved gloves to handle POL
  - seek medical aid for all suspected cases

Chilblains

- Nonfreezing cold injury
- Cold, wet conditions (between 32-60ºF, high humidity)
- Repeated, prolonged exposure of bare skin
- Can develop in only a few hours
- Ears, nose, cheeks, hands and feet

Chilblains

- Symptoms:
  - initially pale and colorless
  - worsens to achy, prickly sensation then numbness
  - red, swollen, hot, itchy, tender skin upon rewarming
  - blistering in severe cases

Chilblains

- Treatment
  - prevent further exposure
  - wash, dry gently
  - rewarm (apply body heat)
  - don’t massage or rub
  - dry sterile dressing
  - seek medical aid

Chilblains

- Prevention
  - keep dry and warm
  - cover exposed skin
  - wear uniform properly
  - use the “Buddy System”

Trench/Immersion Foot

- Potentially crippling, nonfreezing injury (temps from 50°F-32°F)
- Prolonged exposure of skin to moisture (12 or more hours)
- High risk during wet weather, in wet areas, or sweat accumulated in boots or gloves

Trench/Immersion Foot

- Symptoms
  - initially appears wet, soggy, white, shriveled
  - sensations of pins and needles, tingling, numbness, and then pain
  - skin discoloration - red, bluish, or black
  - becomes cold, swollen, and waxy appearance
  - may develop blisters, open weeping or bleeding
  - in extreme cases, flesh dies

Trench/Immersion Foot

Trench/Immersion Foot

- Treatment
  - prevent further exposure
  - dry carefully
  - DO NOT break blisters, apply lotions, massage, expose to heat, or allow to walk on injury
  - rewarm by exposing to warm air
  - clean and wrap loosely
  - elevate feet to reduce swelling
  - evacuate for medical treatment

Trench/Immersion Foot

- Prevention
  - keep feet clean and dry
  - change socks at least every 8 hours or whenever wet and apply foot powder
  - bring extra boots to field - alternate boots from day to day to allow boots to dry.
  - no blousing bands
  - report all suspected cases to leadership

Dehydration

- A loss of body fluids to the point of slowing or preventing normal body functions
- Increases chance of becoming a cold weather casualty (especially hypothermia)

Dehydration

- Symptoms
  - dark urine
  - headache
  - dizziness, nausea
  - weakness
  - dry mouth, tongue, throat, lips
  - lack of appetite
  - stomach cramps or vomiting
  - irritability
  - decreased amount of urine being produced
  - mental sluggishness
  - increased or rapid heartbeat
  - lethargic
  - unconsciousness

Dehydration

- Treatment
  - drink WATER or other warm liquids
  - water should be sipped, not gulped
  - do not eat snow
  - Rest
  - get medical treatment

Dehydration

- Prevention
  - drink minimum of 3 canteens of water daily for inactivity and 5-6 quarts for activity
  - monitor urine color
  - do not wait until you are thirsty
  - drink hot liquids for warmth

Carbon Monoxide Poisoning

- When oxygen in the body is replaced by carbon monoxide
  - colorless, odorless, tasteless gas resulting from incomplete combustion
- Inadequate ventilation from engines, stoves, heaters

Carbon Monoxide Poisoning

- Symptoms
  - headache
  - dizziness
  - weakness
  - excessive yawning
  - ringing in ears
  - confusion
  - nausea
  - bright red lips, eyelids
  - grayish tint in dark-skinned people
  - drowsiness
  - unconsciousness
  - possibly death

Carbon Monoxide Poisoning

- Treatment
  - move to fresh air immediately
  - seek medical aid promptly
  - provide mouth-to-mouth resuscitation if victim is not breathing

Carbon Monoxide Poisoning

- Prevention
  - ensure proper ventilation
  - don’t use unvented heaters or engines
  - ensure heaters are regularly serviced
  - turn heaters off when not needed (during sleep)
  - if heater kept on during sleep, post a fire guard
  - never sleep in vehicle with engine running
  - never wrap poncho around vehicle exhaust to collect heat

Snow Blindness

- Inflammation and sensitivity of the eyes caused by ultraviolet rays of the sun reflected by the snow or ice

- Symptoms
  - gritty feeling in eyes
  - redness and tearing
  - eye movement will cause pain
  - headache

Snow Blindness

- Treatment
  - remove from sunlight
  - blindfold both eyes or cover with cool, wet bandages
  - seek medical attention
  - recovery may take 2-3 days
- Prevention
  - eye protection
    - dark, UV protective glasses
    - field expedient-cut narrow slits in MRE cardboard and tie around head
  - do not wait for discomfort to begin

Winter Sunburn

- Burning of the skin due to overexposure to the sun and UV light
- Contributing factors
  - fair skin, light hair
  - exposed skin
  - reflective qualities of the snow
  - high altitudes
- Symptoms
  - redness of skin, slight swelling (1st deg)
  - prolonged exposure (2nd deg)
    - pain and blistering
    - chills, fever, headache

Winter Sunburn

- Treatment
  - soothing skin creams in mild cases
  - in severe cases, seek medical attention
  - ibuprofen for pain
- Prevention
  - cover exposed skin with clothing
  - sunscreen, lip balm
  - limit exposure of skin to the environment

PREVENTING COLD CASUALTIES

- Prior planning and adequate training
- Cold injuries include:
  - Nonfreezing injuries (trench/immersion foot)
  - Freezing injuries (frostbite)
  - Hypothermia
- Cluster of cold casualties increases risk for more
- 5 steps of cold casualty risk management:
  - Identify Hazards
  - Assess Hazards
  - Develop Controls
  - Implement Controls
  - Supervise and Evaluate

Immersion Foot (mild)

STEP 1: IDENTIFY HAZARDS

- To keep warm, remember the acronym C-O-L-D

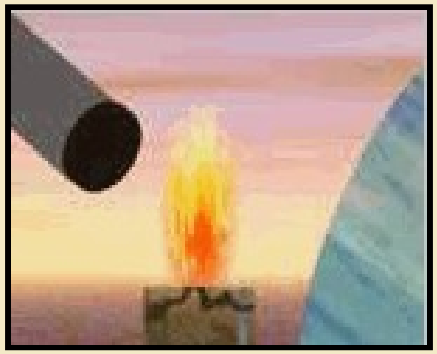
  C - Cleanliness and Care
  O- Overheating
  L - Layers and Looseness
  D- Dry

- The following are cold injury hazards:

  - Cold (temperature 40°F or below)
  - Wet (rain, snow, ice, humidity or wet clothes)
  - Wind (5 mph or greater)
  - Lack of adequate shelter/clothes
  - Lack of water or provisions

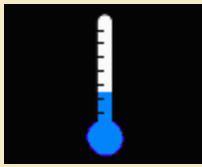
STEP 1: IDENTIFY HAZARDS con't

- **The following factors combine to place Soldiers at higher risk for cold injury:**



  - **Previous day cold casualties**
  - **Hunger**
  - **Low activity**
  - **Fatigue/sleep deprivation**
  - **Lack of cold weather experience**
  - **Dehydration or Poor hydration**
  - **Illness or injury/wounds**
  - **Medications**
  - **Prior history of cold injury**
  - **Overly motivated Soldiers**
  - **Tobacco/alcohol within last 24 h**

STEP 2: ASSESS HAZARDS



NWS Windchill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

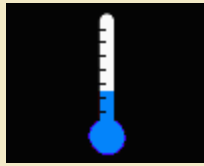
Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

- **Recognize conditions that influence risk of cold injury:**
  - **Temperature**
  - **Wind**
  - **Humidity**
  - **Ground conditions**

- **Wind Chill Chart**
- **Movement or lack of it**

STEP 3: DEVELOP CONTROLS



- Train all leaders and all Soldiers every year
- Properly fitting cold weather clothing and footgear
- Insulation (layering); adjustments for activity and environment
- Don’t allow wear of Gortex during physical act
- Every Soldier wears gloves
- Lip balm/ChapStick
- Gloves approved for handling POL, when applicable
- Integrate controls into SOP

STEP 4: IMPLEMENT CONTROLS

- Battle buddies are the first-line of defense

- Leadership controls:
  - Uniform checks
  - Limit activities in extreme c
  - Covered troop transport
  - Warming tents
  - Hot food & drink

Battle of the Bulge, Jan 1945

- Facility controls:
  - Army approved heaters
  - Properly train fire guards
  - Heating equipment is properly maintained
  - Inspect shelters for maximum cold protection and structural safety

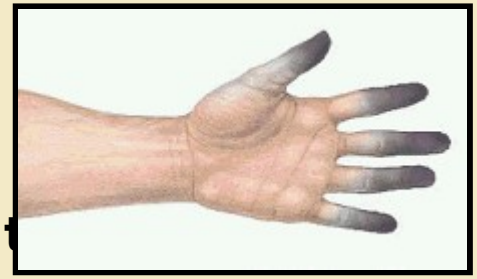
OTHER COLD WEATHER LEADER CONTROLS

- **Leaders should repeatedly ask the following questions concerning the risk for Cold Injury when planning and executing training in cold weather:**
  - **Do Soldiers have adequate shelter/clothi**
  - **Have Soldiers eaten warm meals?**
  - **Are Soldiers in contact with bare metal o**
  - **Are Soldiers in contact with wet ground?**
  - **Are Soldiers in wet clothes?**
  - **Can Soldiers move about to keep warm?**
  - **Do Soldiers have dry and warm feet?**
  - **Are battle buddy teams being maintained?**

Valley Forge, DEC 1777

STEP 5: SUPERVISE AND EVALUATE

- **Leaders take personal responsibility**
- **Set and enforce the standard**
- **Monitor implementation of controls**
- **SPOT CHECK, SPOT CHECK, SPOT CHECK! (ears, nose, hands, feet)**
- **Record, report, and monitor risk:**
  - **Increase of cold injury casualties**
  - **Increased complaints/comments about**
  - **Shivering, stomping, jumping-jacks**
  - **Signs or symptoms of frostbite**



Frostbite

Conclusion

- Dress properly
- Drink plenty of fluids
- Eat right
- Keep in shape
- Get plenty of rest
- Minimize periods of inactivity
- Maintain a positive attitude
- Implement Cold Casualty Risk Management

QUESTIONS, COMMENTS, or